DOCUMENT RESUME

ED 309 920 SE 050 399

TITLE Science and Technology Data Book, 1989.
INSTITUTION National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
REPORT NO NSF-88-332
PUB DATE 89
NOTE 59p.; For 1988 issue see ED 290 635. Contains some small type and colored graphs which may not reproduce well.
PUB TYPE Statistical Data (110)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *College Science; Doctoral Degrees; Employment Patterns; Financial Support; Global Approach; Graduate Students; Higher Education; *Human Resources; *International Trade; Minority Groups; *Research and Development; *Science and Society; Statistics; Tables (Data); *Technology

ABSTRACT

Designed to provide easy access to information pertaining to science and technology, this data book provides indicators on: (1) funding for research and development; (2) human resources utilization and supply; and (3) international science and technology indicators. Graphs and charts are used to note research and development efforts from a nationwide perspective with expenditures from federal, industrial and academic sources illustrated. Comparative graphs on human resources provide data on employed scientists and engineers, employed doctorates, women in science and technology, racial minorities, and school retention rates. In addition, assessments of the supply of professionals in science and technology are presented by type and number of degrees awarded, and full-time graduate students currently enrolled. Several international science and technology indicators are outlined, such as ratios of research and development to gross national product (by country), U.S. patents granted to U.S. and foreign inventors, data on U.S. trade balances in high technology, and U.S. scientific and technical publications as compared to world publications. Three pages list other science resources. (MVL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

science and technology

DATA BOOK

1989

National Science Foundation

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

NSF

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

science and technology DATA BOOK

1989

Division of Science Resources Studies
National Science Foundation
Washington, D.C. 20550

3

Telephonic Device for the Deaf

The National Science Foundation has Telephonic Device for the Deaf (TDD) capability which enables individuals with hearing impairment to communicate with the Division of Personnel and Management for information relating to NSF programs, employment, or general information. The TDD number is (202) 357-7492.

Suggested Citation of This Publication

Science and Technology Data Book (NSF 88-332) (Washington, D.C., 1989).

4

Contents

		Page
R&D Funding		1
National	*Figure 1.* The national R&D effort	2
	Figure 2. National R&D funding by source	3
	Figure 3. National R&D funding by performer	4
	Figure 4. National R&D spending by character of work	5
Federal	*Figure 5.* Federal R&D obligations by character of work	6
	Figure 6. Federal R&D obligations by major agency	7
	Figure 7. Federal R&D obligations by major performer	8
	Figure 8. Federal obligations for basic research by major field of science/engineering	9
	Figure 9. Federal obligations for basic research by major agency	10
	Figure 10. Federal obligations for basic research by major performer	11
Industry	*Figure 11.* Industrial R&D expenditures by source of funds	12
	Figure 12. Industrial R&D expenditures by character of work	13
	Figure 13. Company R&D expenditures and R&D/sales ratio of six leading industries	14
Academic	*Figure 14.* Academic R&D expenditures by source	15
	Figure 15. Academic R&D expenditures by character of work	16
	Figure 16. Academic R&D expenditures by field: FY 1987	17
	Figure 17. Federal obligations to universities and colleges by type of activity	18

			Page
Human Resources			19
Utilization	*Figure 18.*	Employed scientists/engineers by field: 1988	20
	Figure 19.	Scientists and engineers by field and citizenship: 1986	21
	Figure 20.	Employed scientists and engineers by sector: 1988	22
	Figure 21.	Employed scientists and engineers by primary work activity: 1988	23
	Figure 22.	Employed scientists and engineers by highest degree: 1986	24
	Figure 23.	Doctoral scientists and engineers by field and citizenship: 1985	25
	Figure 24.	Employed doctorates in science and engineering by field: 1985	26
	Figure 25.	Women and minorities as a proportion of all employed scientists, engineers, and professional workers	27
	Figure 26.	Retention rates for U.S. citizens, fifth grade through receipt of science/engineering (S/E) doctorate: 1966-86	28
Supply	*Figure 27.*	Bachelor's degrees awarded in major science/engineering fields	29
	Figure 28.	Master's degrees awarded in major science/engineering fields	30
	Figure 29.	Doctor's degrees awarded in major science/engineering fields	31
	Figure 30.	Full-time science/engineering graduate students in doctorate-granting institutions by source of major support	32
	Figure 31.	Full-time science/engineering graduate students in doctorate-granting institutions by type of major support	33
	Figure 32.	Full-time science/engineering graduate students in doctorate-granting institutions by field and citizenship	34

6

Page

International S/T Indicators 35

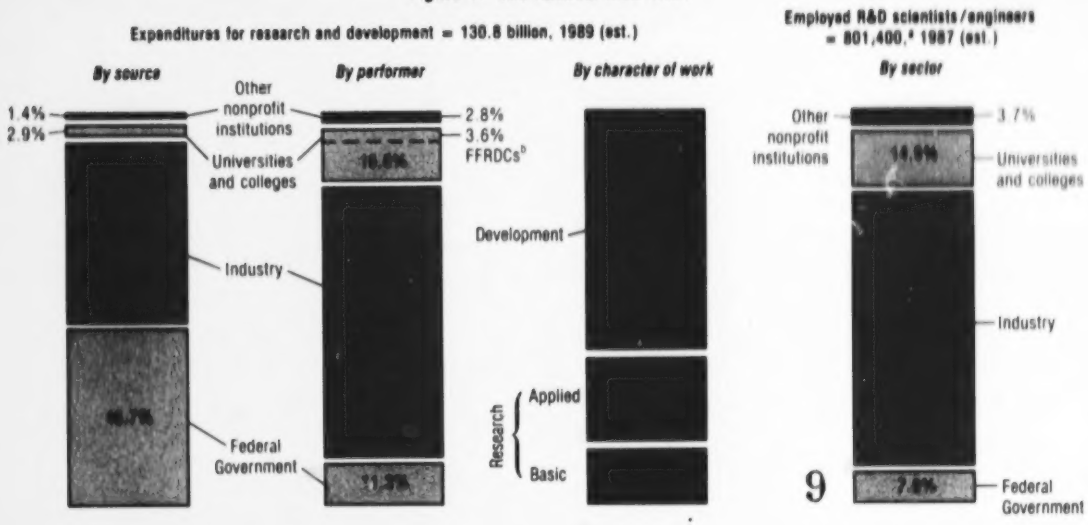
Figure 33. Scientists and engineers engaged in R&D per 10,000 labor force by country 36
Figure 34. Scientists and engineers engaged in research and development by country: 1965-87 37
Figure 35. R&D/GNP ratios by country 38
Figure 36. National expenditures on research and development by selected countries: 1980-87 39
Figure 37. U.S. patents granted to U.S. and foreign inventors by year of application 40
Figure 38. U.S. receipts and payments of royalties and license fees associated with unaffiliated residents of selected countries 41
Figure 39. Foreign direct investment in the United States 42
Figure 40. Gross domestic product per employed person 43
Figure 41. U.S. trade balance in high-technology and other manufactured produce groups 44
Figure 42. Total foreign affiliate assets of U.S. corporations, as a percent of total parent assets: 1986 45
Figure 43. Exports of high-technology products as a percent of shipments: 1978-86 46
Figure 44. Export market shares, selected high-technology products: 1976, 1980, and 1986 47
Figure 45. U.S. scientific and technical (S/T) publications as a percent of world S/T publications: 1986 48

Other Science Resources Publications 49

8

R&D FUNDING

Figure 1. The national R&D effort



[a]Full-time equivalents.
[b]Federally funded research and development centers administered by universities and colleges.
SOURCE: National Science Foundation
Additional data may be obtained from John R. Chirichello, SRS, Tel. (202) 634-4625.

Figure 2. **National R&D funding by source**

[Dollars in millions]

Average annual rate of change

(Constant (1982) dollars)[1]

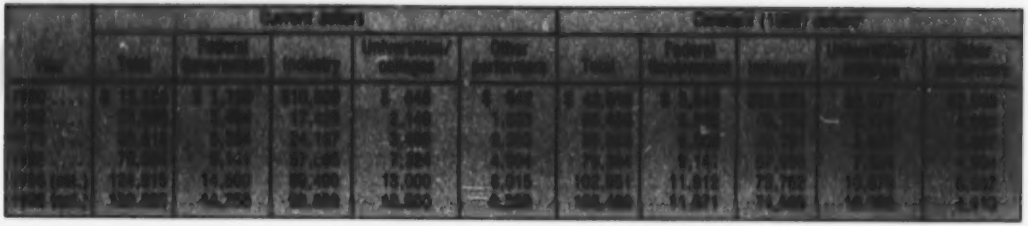
[1]Based on GNP implicit price deflator

SOURCE: National Science Foundation

Additional data may be obtained from John R. Chrichalis, SRS, Tel. (202) 634-4625

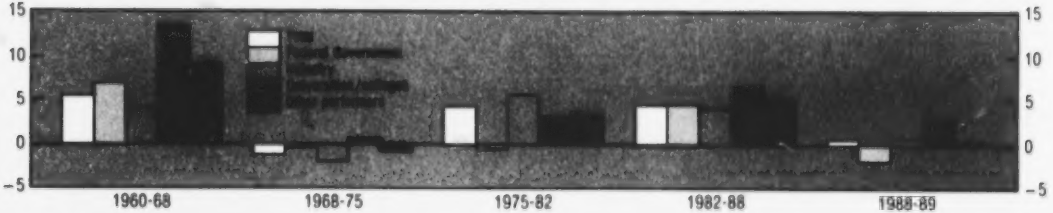
Figure 3. **National R&D funding by performer**

[Dollars in millions]



Average annual rate of change

Constant (1982) dollars[1]

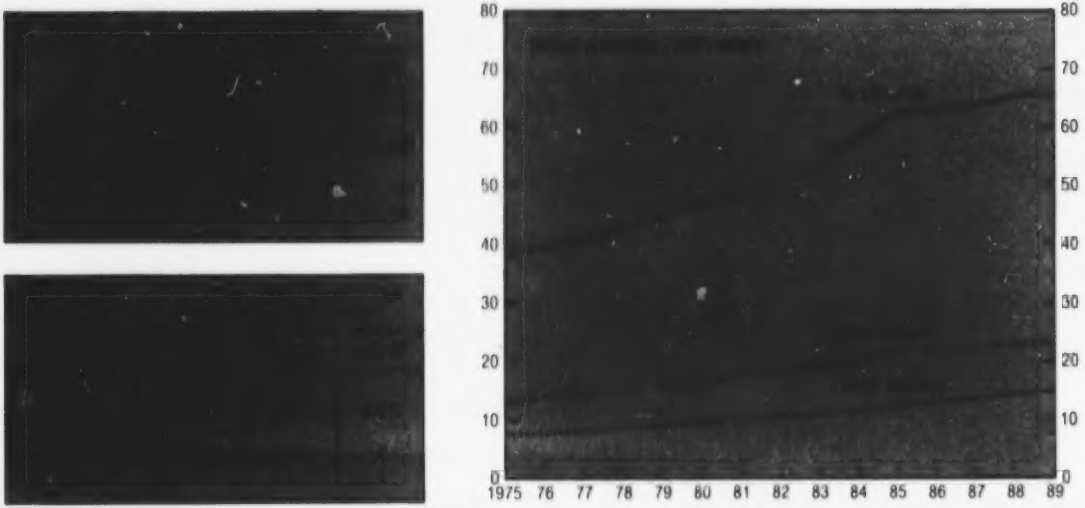


[1]Based on GNP implicit price deflator

SOURCE: National Science Foundation

Additional data may be obtained from: John R. Chrichello, SRS, Phone: (202) 634-4625

Figure 4. **National R&D spending by character of work**



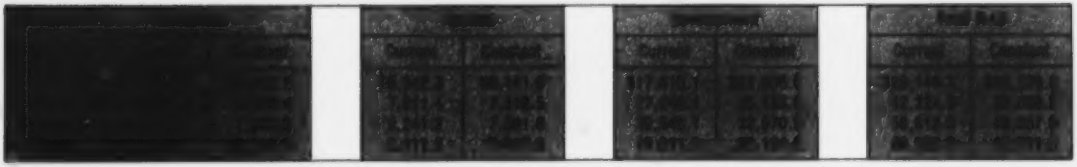
[redacted]

[redacted]

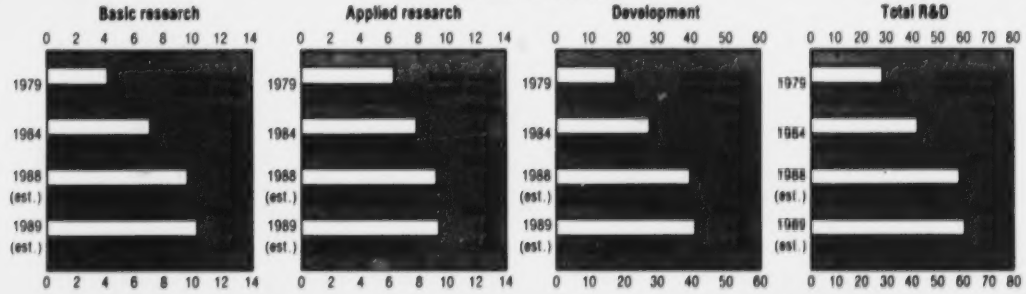
[redacted]

Figure 5. **Federal R&D obligations by character of work**

[Dollars in millions]



[Billions of dollars]

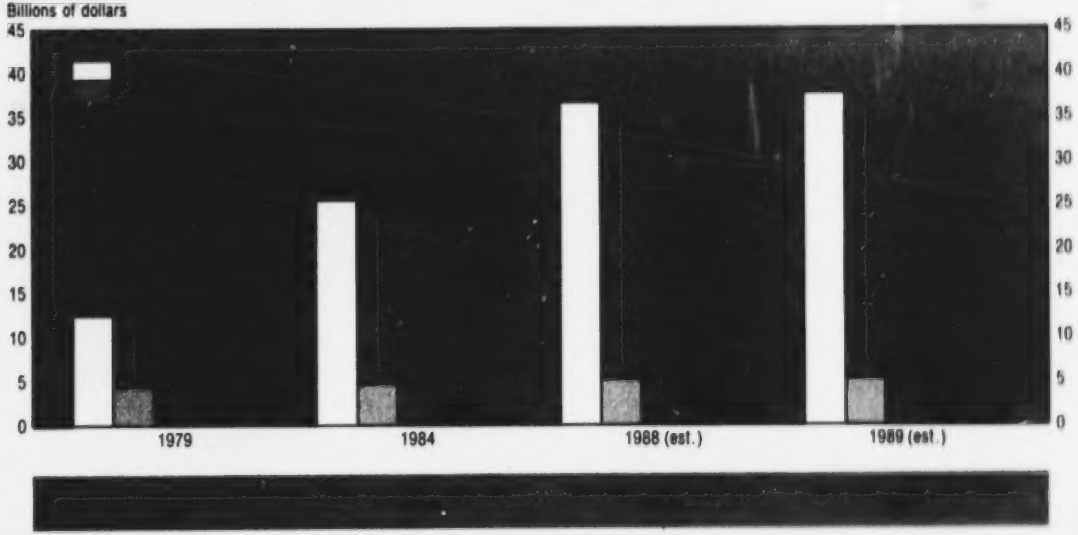


[a]Based on GNP implicit price deflator

SOURCE: National Science Foundation

Additional data may be obtained from Margaret R. Grucza, SRS, Tel. (202) 634-4636.

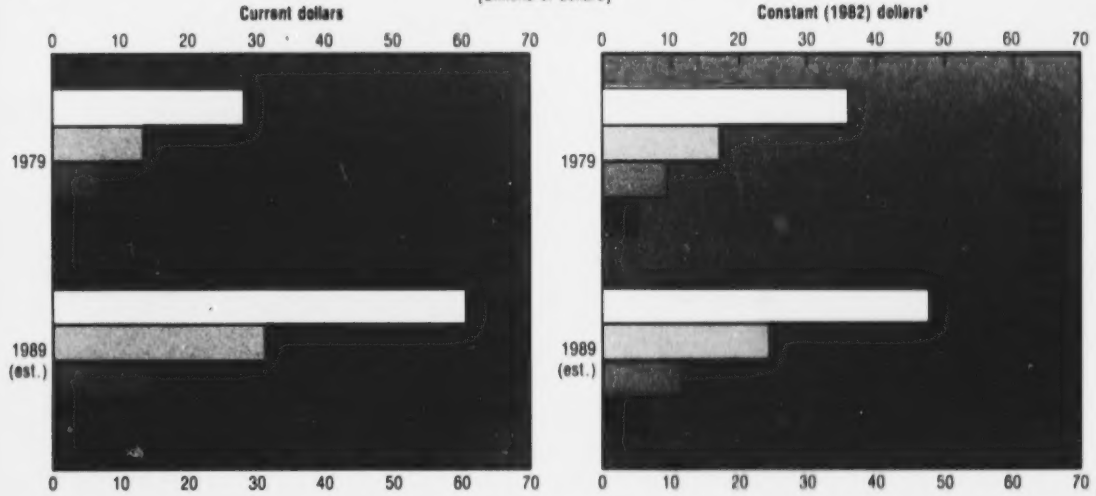
Figure 6. **Federal R&D obligations by major agency**



SOURCE: National Science Foundation
Additional data may be obtained from Margaret R. Grucza, SRS, Tel. (202) 634-4636

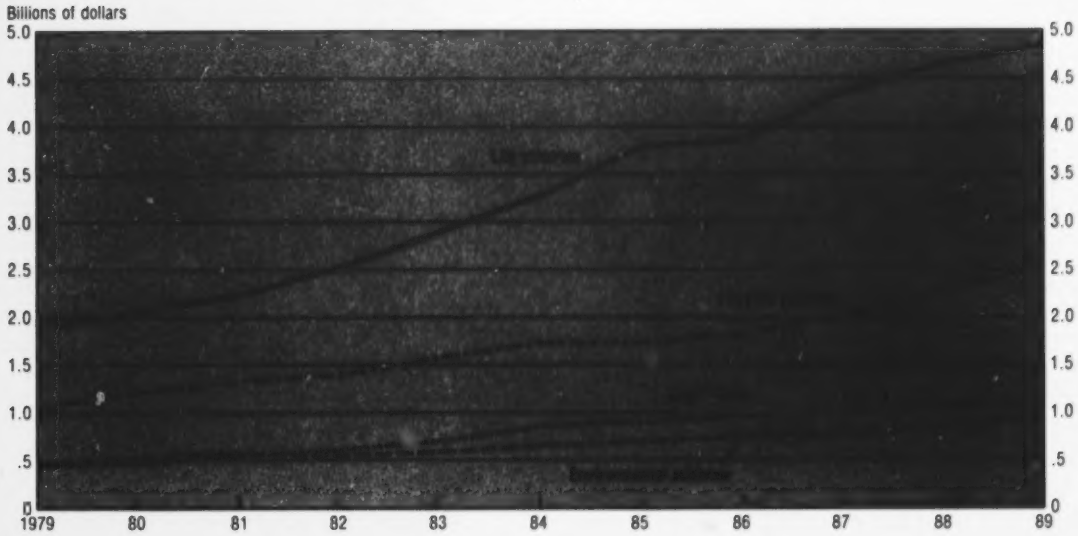
Figure 7. **Federal R&D obligations by major performer**

[Billions of dollars]



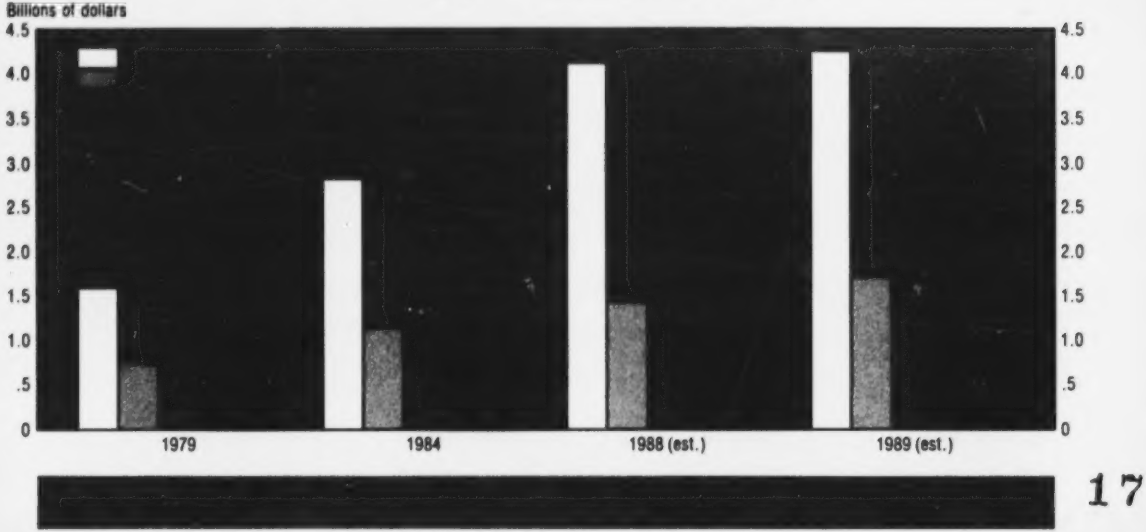
¹Based on GNP implicit price deflator.
²Includes federally funded research and development centers.
SOURCE: National Science Foundation
Additional data may be obtained from Margaret R. Grucza, SRS, Tel. (202) 634-4636.

Figure 8. **Federal obligations for basic research by major field of science/engineering**



SOURCE: National Science Foundation
Additional data may be obtained from Margaret R. Grucza, SRS, Tel. (202) 634-4636

Figure 9. **Federal obligations for basic research by major agency**

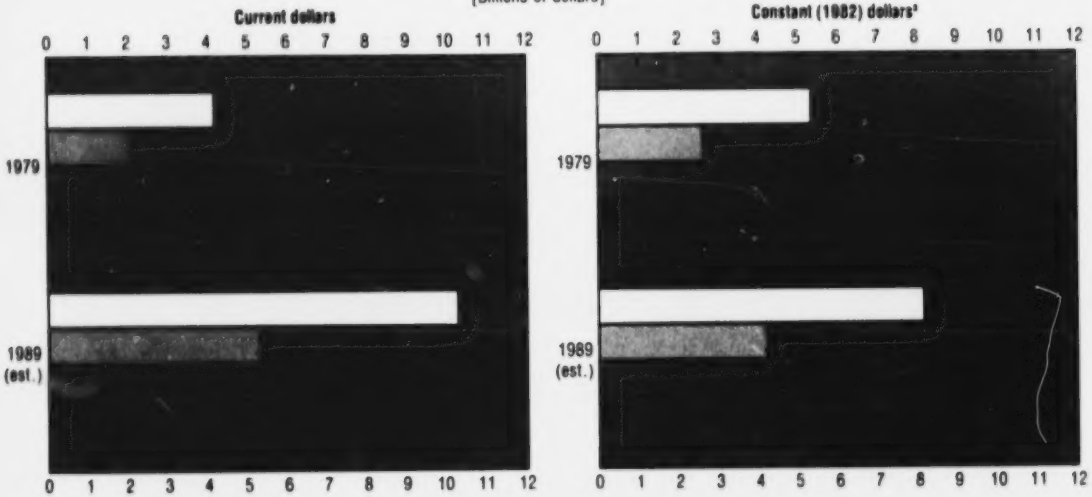


17

SOURCE: National Science Foundation
Additional data may be obtained from: Margaret R. Grucza, SRS, Phone: (202) 634-4638

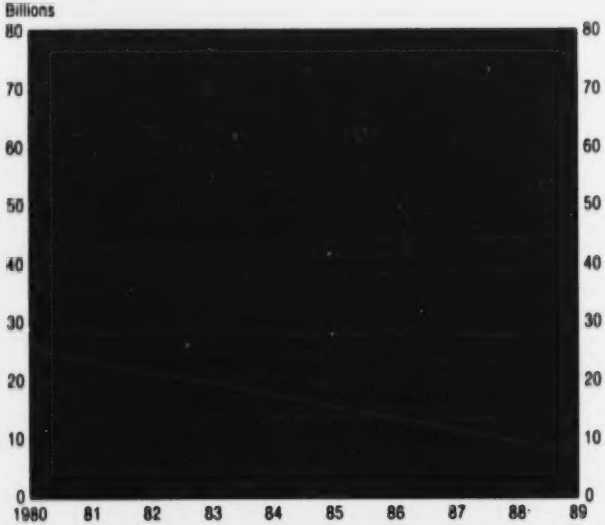
Figure 10. **Federal obligations for basic research by major performer**

[Billions of dollars]



²Based on GNP implicit price deflator
³Includes federally funded research and development centers
SOURCE: National Science Foundation
Additional data may be obtained from Margaret R. Grucza, SRS, Tel (202) 634-4636

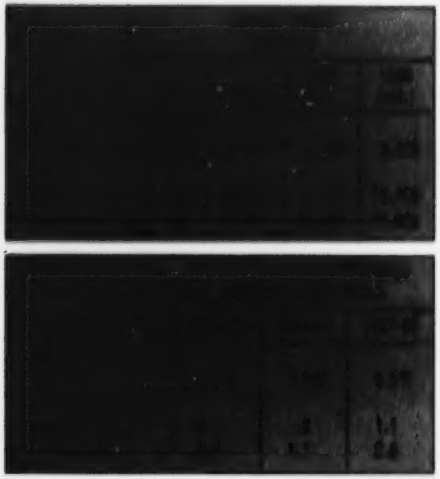
Figure 11. **Industrial R&D expenditures by source of funds**

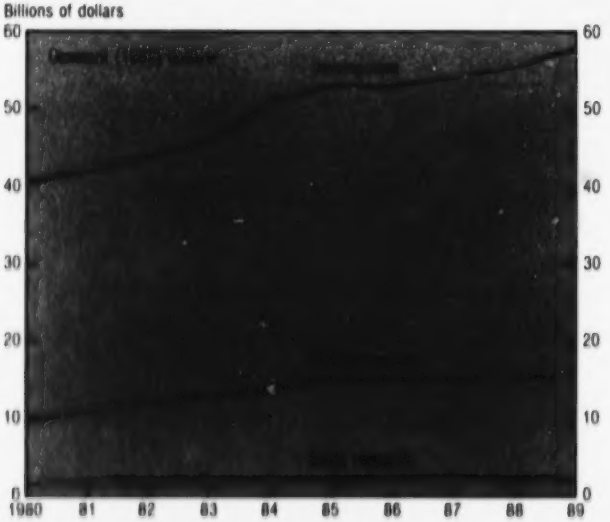


19

*Based on GNP implicit price deflator
SOURCE: National Science Foundation
Additional data may be obtained from Thomas J. Hogan, 5/85. Tel. (202) 634-4643

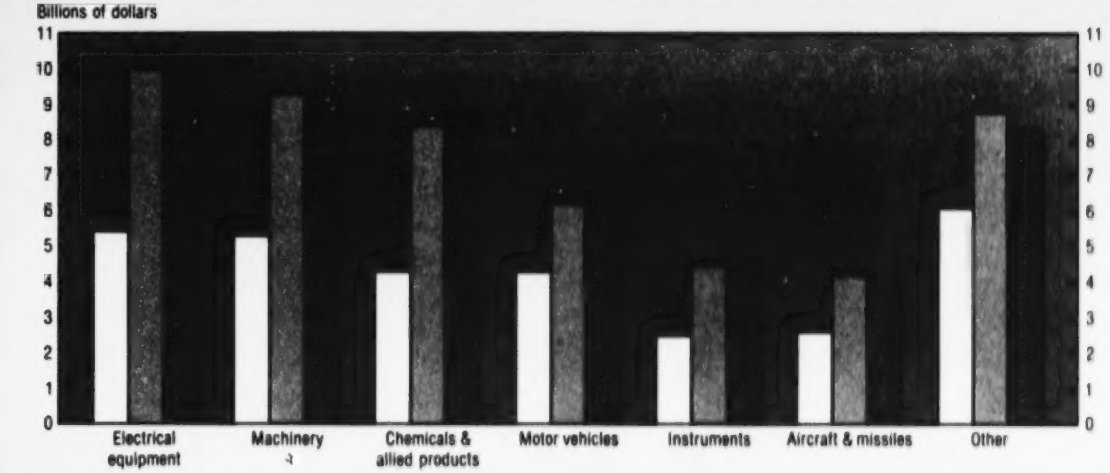
Figure 12. **Industrial R&D expenditures by character of work**





*Based on GNP implicit price deflator
SOURCE: National Science Foundation
Additional data may be obtained from Thomas J. Hogan, SRS, Tel. (202) 634-4648

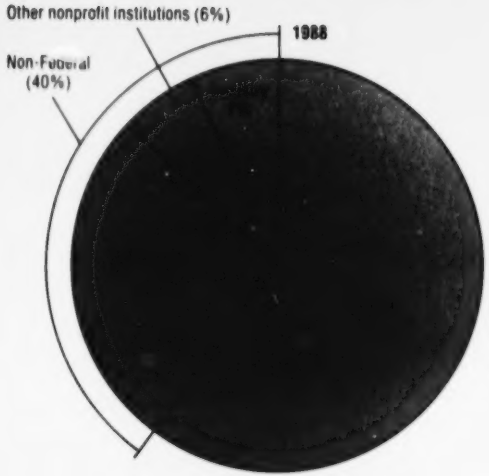
Figure 13. **Company R&D expenditures and R&D/sales ratio of six leading industries**

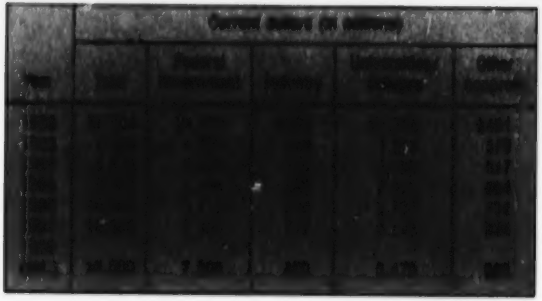


21

SOURCE: National Science Foundation
Additional data may be obtained from Thomas J. Hogan, SRS, Tel: (202) 634-4648.

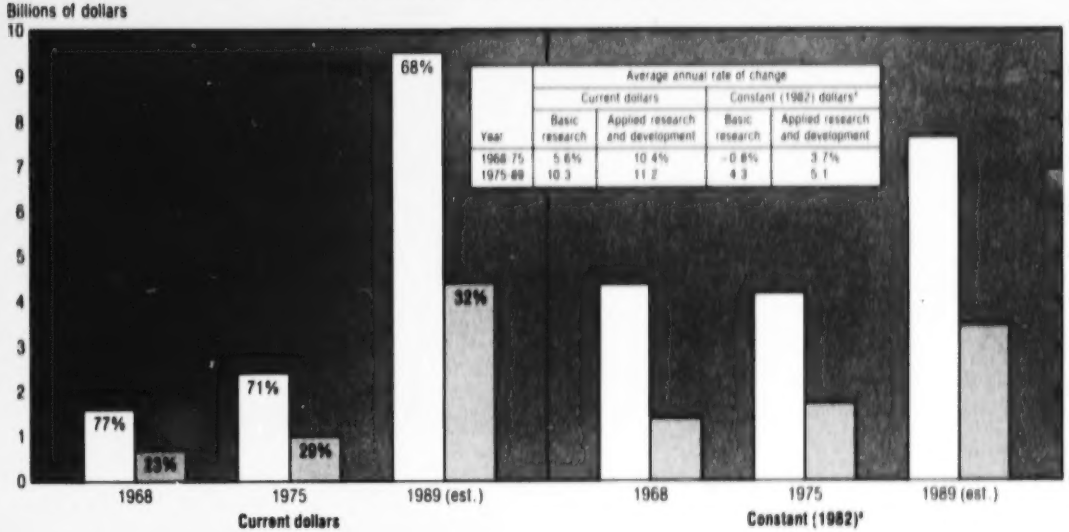
Figure 14. Academic R&D expenditures by source





NOTE: The Federal portion of academic R&D has ranged between 60 percent and 69 percent during the 1970-88 period.
SOURCE: National Science Foundation.
Additional data may be obtained from James B. Hoehn, SRS, Tel. (202) 634-4673.

Figure 15. Academic R&D expenditures by character of work



Year	Average annual rate of change: Current dollars — Basic research	Current dollars — Applied research and development	Constant (1982) dollars[a] — Basic research	Constant (1982) dollars[a] — Applied research and development
1968-75	5.6%	10.4%	-0.8%	3.7%
1975-89	10.3	11.2	4.3	5.1

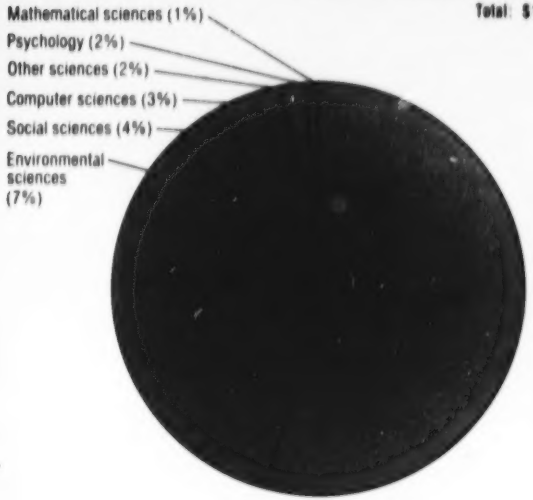
[a]Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Additional data may be obtained from James B. Hoehn, SRS, Tel: (202) 634-4673.

Figure 16. Academic R&D expenditures by field: FY 1987

Total: $12.0 billion



Academic R&D expenditures by field: FYs 1982-87

[Dollars in billions]

NOTE: Because of rounding, components may not add to totals
SOURCE: National Science Foundation

NOTE: The distribution of academic R&D expenditures in FY 1988 was essentially the same as in FY 1987.
SOURCE: National Science Foundation
Additional data may be obtained from James B. Hoehn, SRS, Tel: (202) 634-4673.

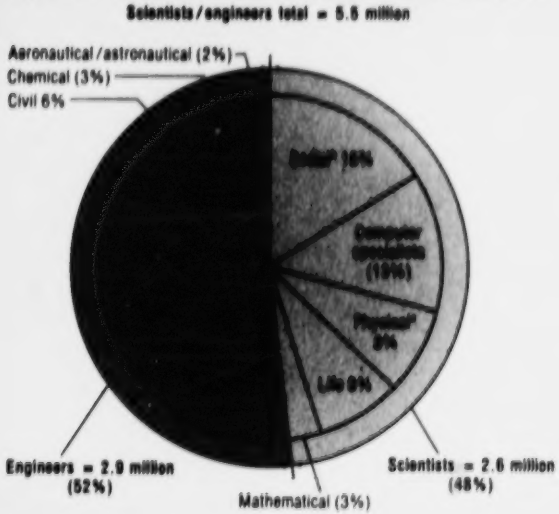
Figure 17. **Federal obligations to universities and colleges by type of activity[1]**

[Dollars in millions]

[1]Detail may not add to total because of rounding.
[2]Total obligations for the years 1981 through 1983 have been estimated by NSF based on revised data on student aid provided by the Department of Education.
[3]Academic research and development is estimated at $7.8 billion for 1988 and $8.2 billion for 1989. Separate data for the other components of academic science/engineering and non-science/engineering are not available.
[4]Separate data were unavailable for this component before 1966. [Its total was imbedded within the total for "all other S/E activities" for the years 1963 through 1965.]
[5]Based on GNP implicit price deflator.
SOURCE: National Science Foundation
Additional data may be obtained from Margaret R. Grucza, SRS, Tel. (202) 634-4638.

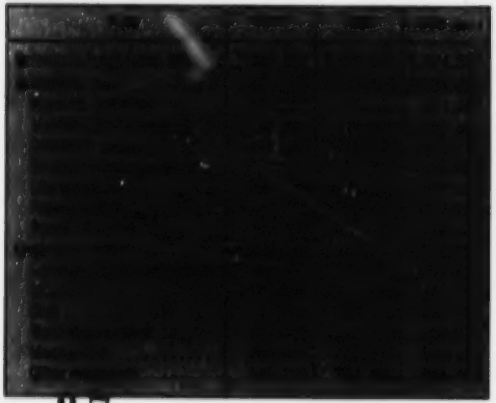
HUMAN RESOURCES

Figure 18. **Employed scientists/engineers by field: 1988 (est.)**



[1]Includes environmental scientists, 2 percent of total scientists and engineers
[2]Includes psychologists, 6 percent of total scientists and engineers
SOURCE: National Science Foundation
Additional data may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4664

Employed scientists and engineers by field

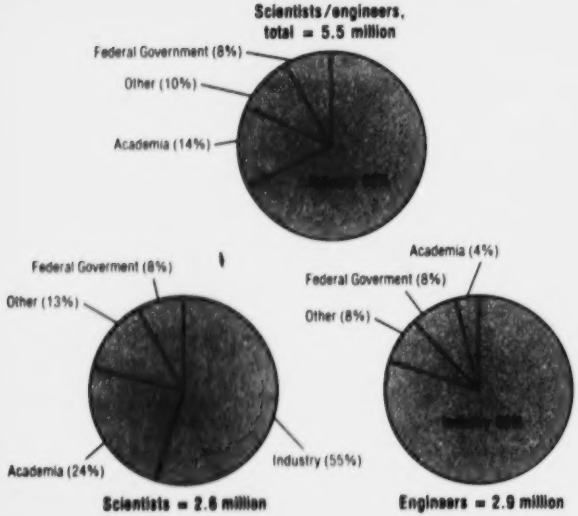


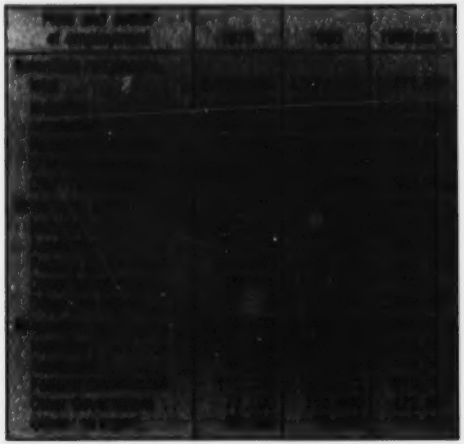
27

Figure 19. **Scientists and engineers by field and citizenship: 1986**

SOURCE: National Science Foundation
Additional information may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4684

Figure 20. **Employed scientists and engineers by sector: 1988 (est.)**

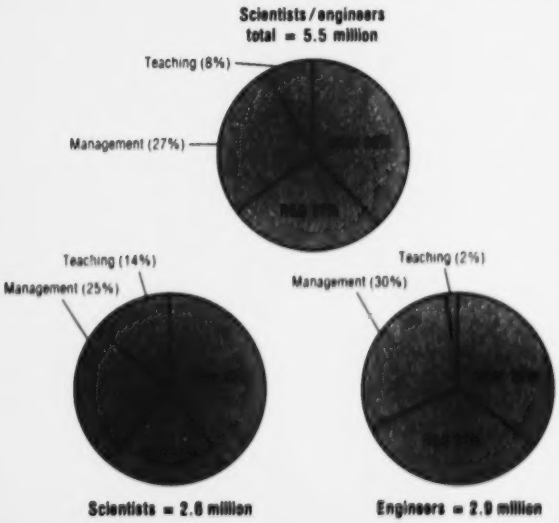




29

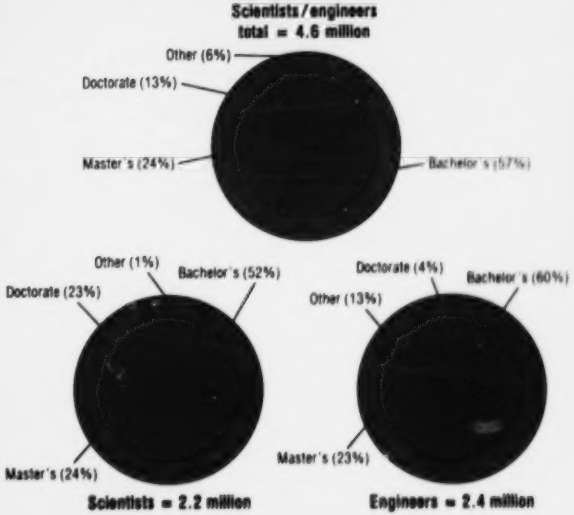
SOURCE: National Science Foundation
Additional data may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4684

Figure 21. **Employed scientists and engineers by primary work activity: 1988 (est.)**



SOURCE: National Science Foundation
Additional data may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4664

Figure 22. **Employed scientists and engineers by highest degree: 1986**

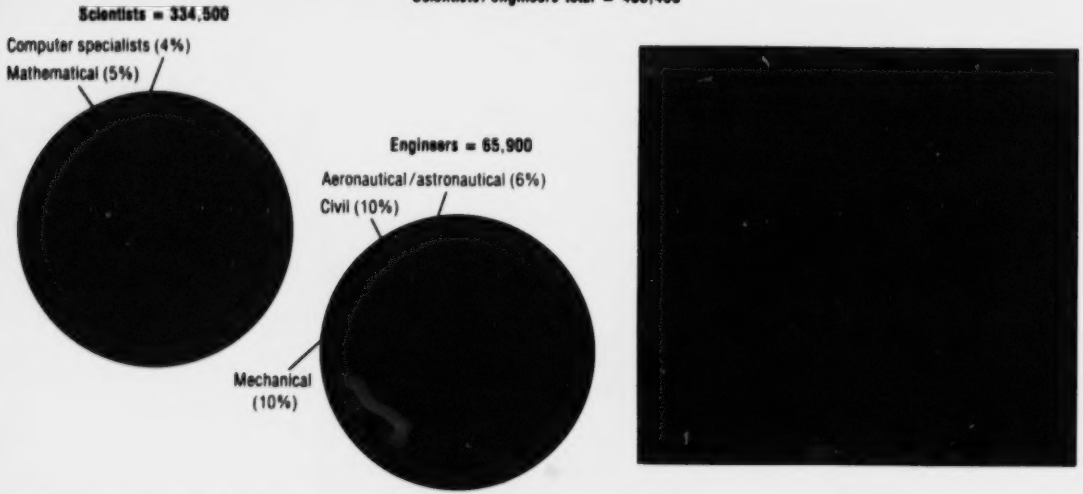


NOTE: Because of rounding, components may not add to totals
SOURCE: National Science Foundation
Additional data may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4664

Figure 23. **Doctoral scientists and engineers by field and citizenship: 1985**

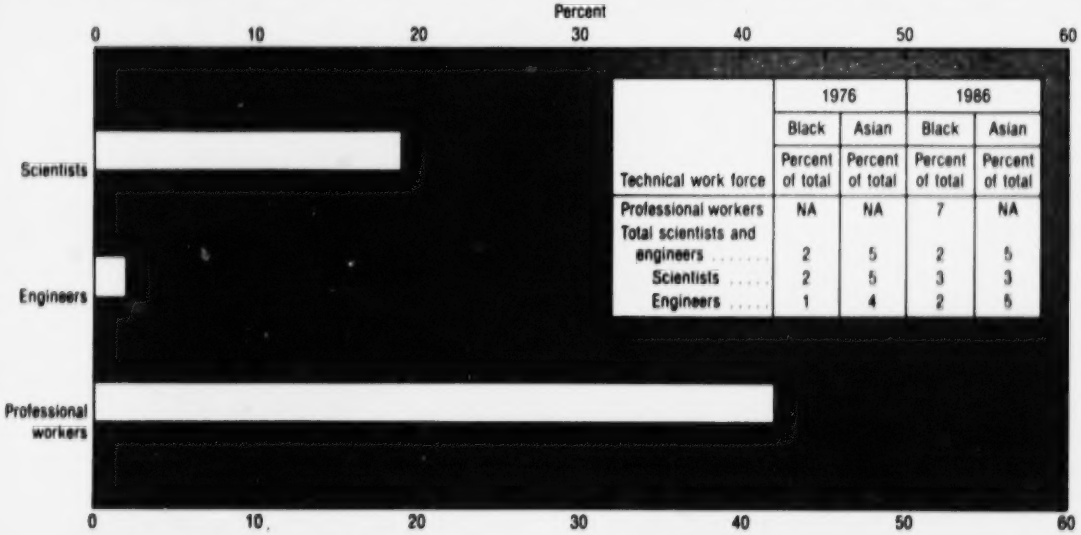
[1]Too few cases to estimate
SOURCE: National Science Foundation
Additional information may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4664

Figure 24. **Employed doctorates in science and engineering by field: 1985**



[1]Includes environmental scientists, 5 percent of total scientists.
[2]Includes psychologists, 16 percent of total scientists.
NOTE: Because of rounding, components may not add to totals.
SOURCE: National Science Foundation
Additional data may be obtained from Michael F. Crowley, SRS, Tel: (202) 634-4684

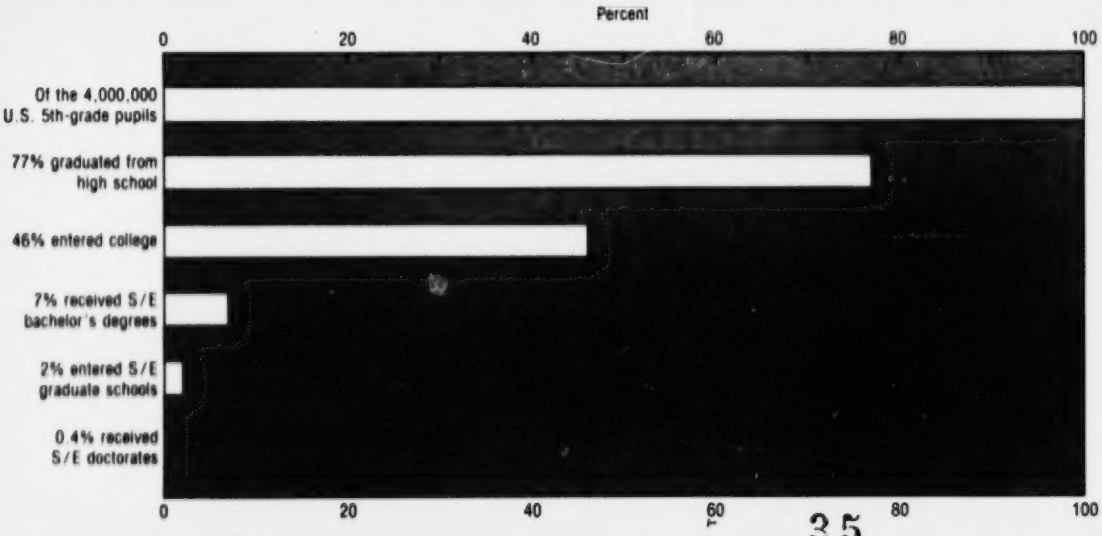
Figure 25. **Women and racial minorities as a proportion of all employed scientists, engineers, and professional workers**



Technical work force	1976		1986	
	Black	Asian	Black	Asian
	Percent of total	Percent of total	Percent of total	Percent of total
Professional workers	NA	NA	7	NA
Total scientists and engineers	2	5	2	5
Scientists	2	5	3	3
Engineers	1	4	2	5

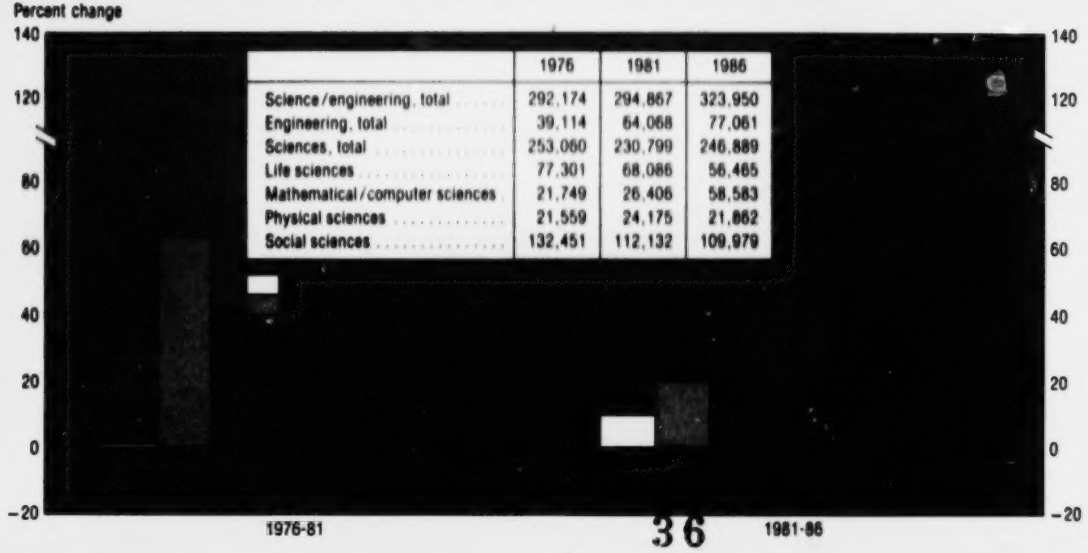
NOTE: NA, not available
SOURCES: National Science Foundation, SRS, and Department of Labor
Additional data may be obtained from Michael F. Crowley, SRS, Tel. (202) 634-4664

Figure 26. **Retention rates for U.S. citizens, fifth grade through receipt of science/engineering (S/E) doctorate: 1966-87**



NOTE: Calculations are based on comparisons of estimates for enrollment and degree awards to U.S. citizens only.
SOURCES: Center for Education Statistics and National Science Foundation, SRS.
Additional data may be obtained from Mary A. Golladay, SRS, Tel: (202) 634-4787.

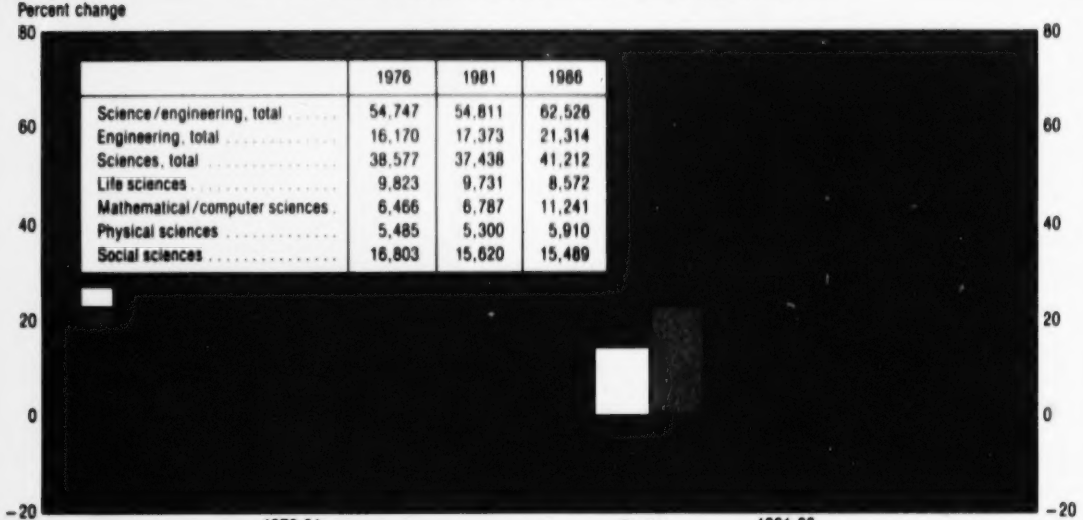
Figure 27. **Bachelor's degrees awarded in major science/engineering fields**



	1976	1981	1986
Science/engineering, total	292,174	294,867	323,950
Engineering, total	39,114	64,068	77,061
Sciences, total	253,060	230,799	246,889
Life sciences	77,301	68,086	56,465
Mathematical/computer sciences	21,749	26,406	58,583
Physical sciences	21,559	24,175	21,862
Social sciences	132,451	112,132	109,979

SOURCES: Center for Education Statistics and National Science Foundation, SRS
Additional data may be obtained from Mary A. Golladay, SRS, Tel: (202) 634-4787.

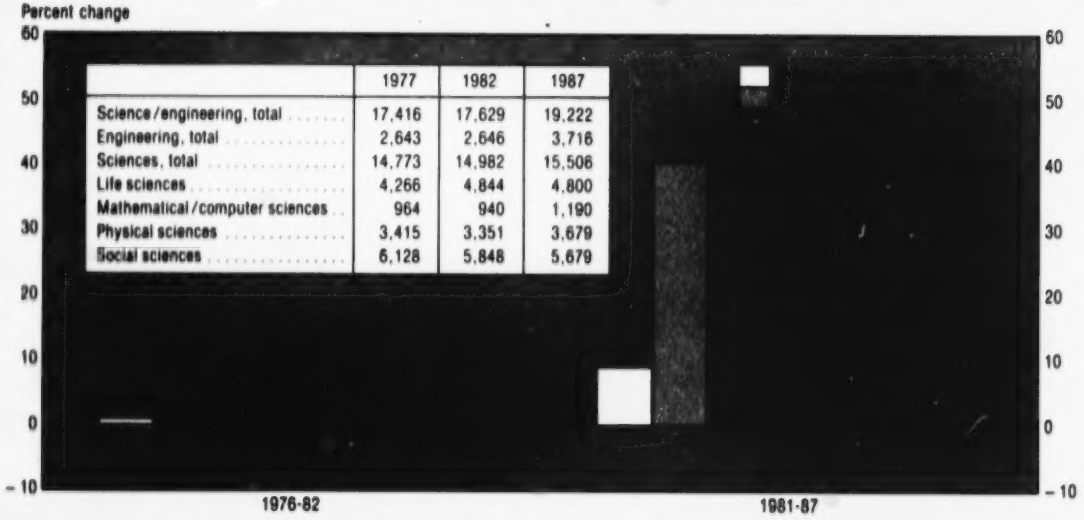
Figure 28. **Master's degrees awarded in major science/engineering fields**



	1976	1981	1986
Science/engineering, total	54,747	54,811	62,526
Engineering, total	16,170	17,373	21,314
Sciences, total	38,577	37,438	41,212
Life sciences	9,823	9,731	8,572
Mathematical/computer sciences	6,466	6,787	11,241
Physical sciences	5,485	5,300	5,910
Social sciences	16,803	15,620	15,489

SOURCES: Center for Education Statistics and National Science Foundation, SRS
Additional data may be obtained from Mary A. Golladay, SRS, Tel. (202) 634-4787

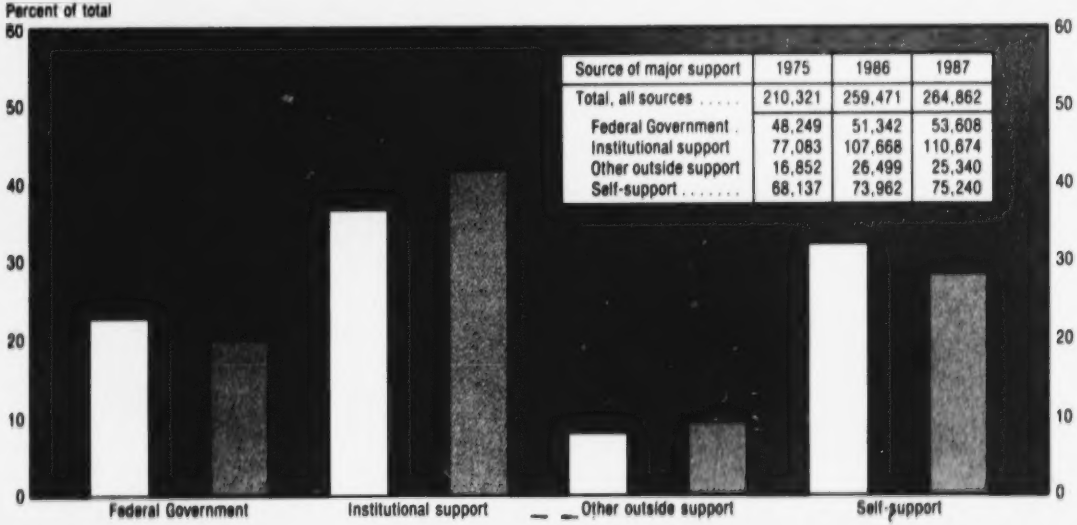
Figure 29. **Doctor's degrees awarded in major science/engineering fields**



	1977	1982	1987
Science/engineering, total	17,416	17,629	19,222
Engineering, total	2,643	2,646	3,716
Sciences, total	14,773	14,982	15,506
Life sciences	4,266	4,844	4,800
Mathematical/computer sciences	964	940	1,190
Physical sciences	3,415	3,351	3,679
Social sciences	6,128	5,848	5,679

[1]Includes earth, atmospherical and marine sciences
[2]Includes psychology
SOURCE: National Science Foundation, SRS
Additional data may be obtained from Mary A. Golladay, SRS, Tel: (202) 634-4787.

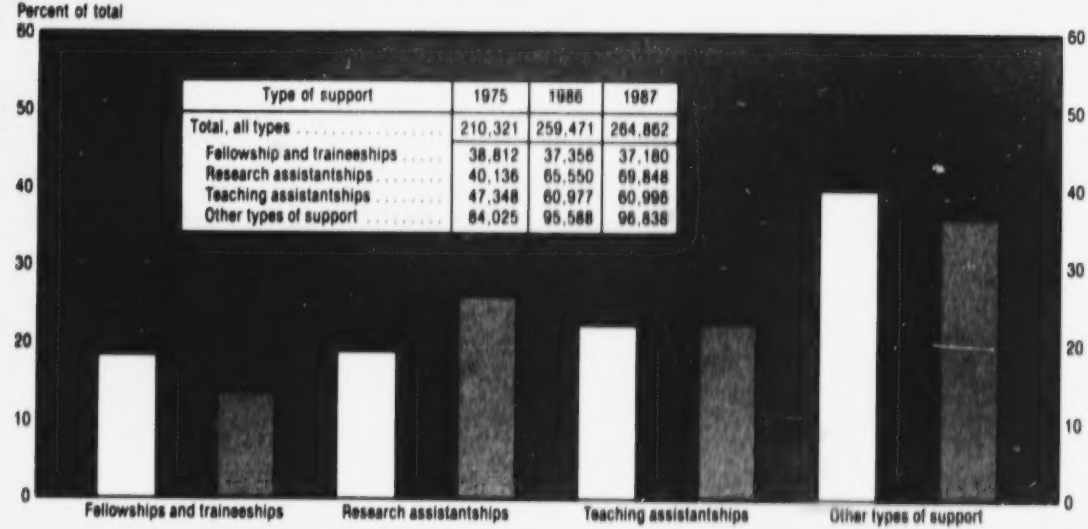
Figure 30. **Full-time science/engineering graduate students in doctorate-granting institutions by source of major support**



Source of major support	1975	1986	1987
Total, all sources	210,321	259,471	264,862
Federal Government	48,249	51,342	53,608
Institutional support	77,083	107,668	110,674
Other outside support	16,852	26,499	25,340
Self-support	68,137	73,962	75,240

SOURCE: National Science Foundation, SRS
Additional data may be obtained from Mary A. Golladay, SRS, Tel: (202) 634-4787.

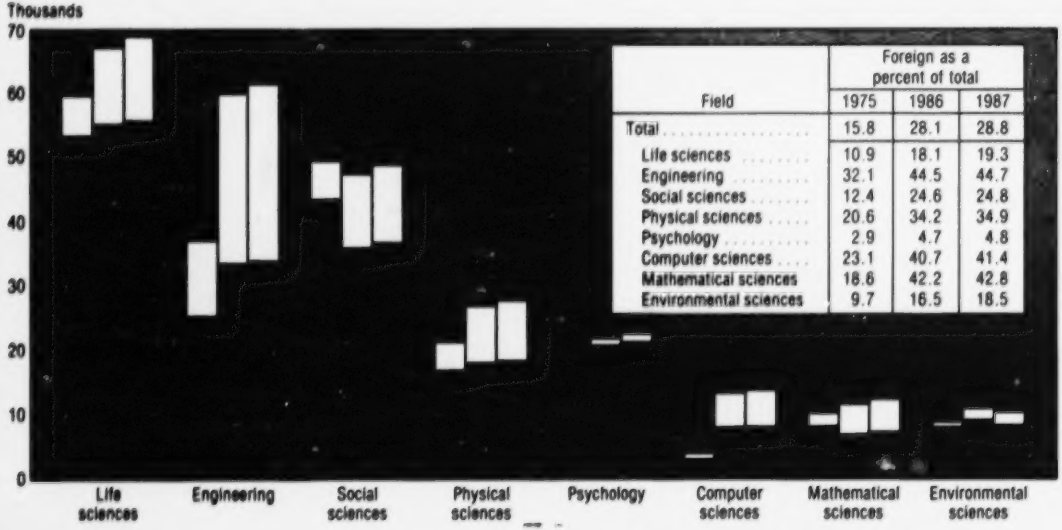
Figure 31. **Full-time science/engineering graduate students in doctorate-granting institutions by type of major support**



Type of support	1975	1986	1987
Total, all types	210,321	259,471	264,862
Fellowship and traineeships	38,812	37,356	37,160
Research assistantships	40,136	65,550	69,848
Teaching assistantships	47,348	60,977	60,996
Other types of support	84,025	95,588	96,838

SOURCE: National Science Foundation, SRS
Additional data may be obtained from Mary A. Golladay, SRS, Tel: (202) 634-4797

Figure 32. **Full-time science/engineering graduate students in doctorate-granting institutions by field and citizenship**



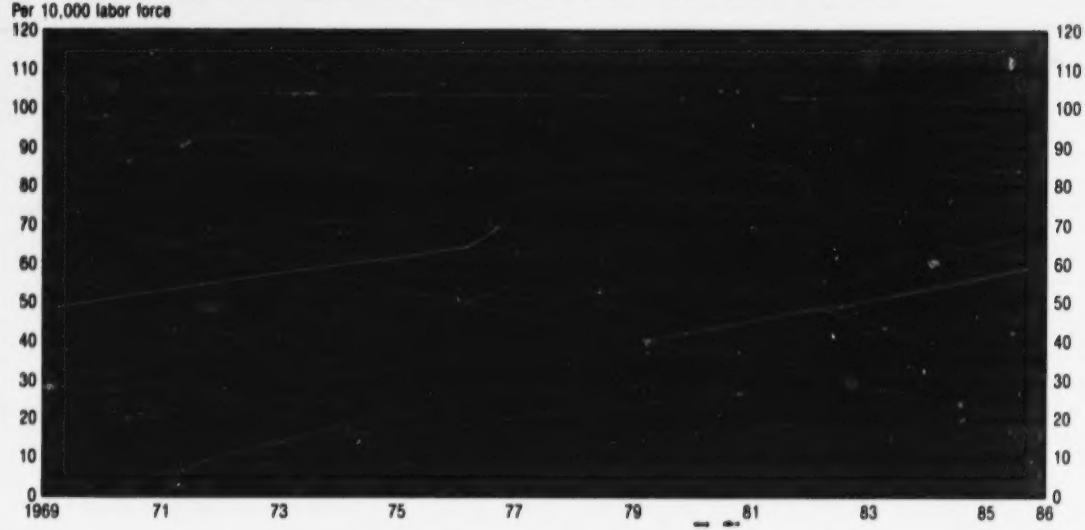
Field	Foreign as a percent of total		
	1975	1986	1987
Total	15.8	28.1	28.8
Life sciences	10.9	18.1	19.3
Engineering	32.1	44.5	44.7
Social sciences	12.4	24.6	24.8
Physical sciences	20.6	34.2	34.9
Psychology	2.9	4.7	4.8
Computer sciences	23.1	40.7	41.4
Mathematical sciences	18.6	42.2	42.8
Environmental sciences	9.7	16.5	18.5

SOURCE: National Science Foundation, SRS
Additional data may be obtained from Mary A. Golladay, SRS, Tel. (202) 634-4787.

12

INTERNATIONAL S/T INDICATORS

Figure 33. **Scientists and engineers engaged in R&D per 10,000 labor force by country**



NOTE: A range has been provided for the U.S.S.R. because of the difficulties inherent in comparing Soviet scientific personnel data.
SOURCES: National Science Foundation, SRS, Organization for Economic Co-operation and Development, Dr. Robert Campbell (Indiana University)
Additional data may be obtained from Jennifer Bond, SRS, Tel. (202) 634-4640.

Figure 34. **Scientists and engineers engaged in research and development by country: 1985-87**

[In thousands]

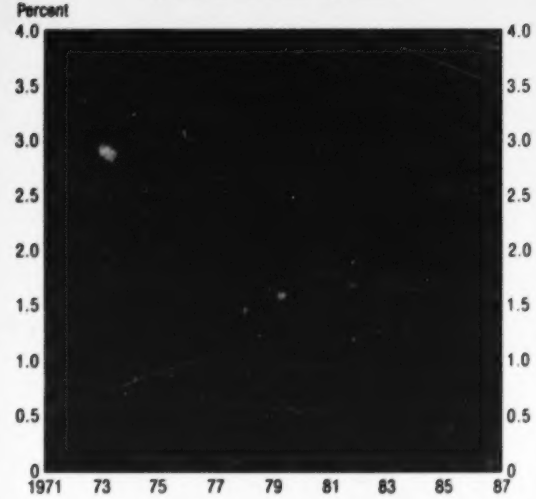
NA = Not available.

NOTES: Table includes all scientists and engineers engaged in research and development on a full-time basis except Japan, whose data include persons primarily employed in research and development in natural sciences and engineering, and the United Kingdom whose data include only the Government and industry sectors. The figures for West Germany increased in 1979 in part because of increased coverage of small and medium enterprises not surveyed in 1977. The figures for France increased in 1981 in part due to a re-evaluation of university research efforts. Data are estimated by the National Science Foundation for the following countries and years: France, 1986 and 1987; West Germany, 1978, 1980, 1982, 1984, 1986, and 1987; United Kingdom, 1984.

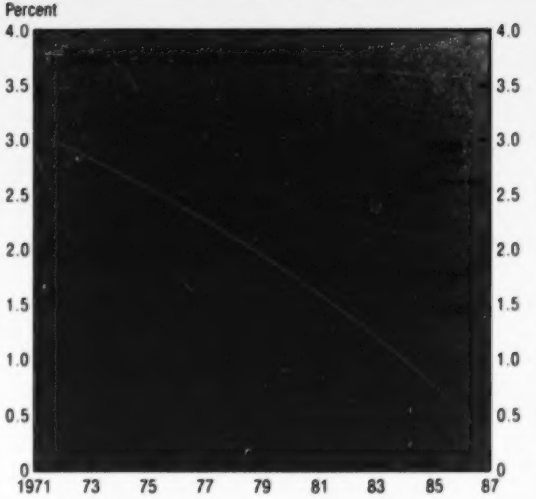
SOURCES: National Science Foundation, SRS; Organisation for Economic Co-operation and Development and national country data. Data for the Soviet Union were provided by Robert Campbell, Indiana University, and Harley Balzer, Georgetown University.

Additional data may be obtained from Jennifer Bond, SRS, Tel: (202) 634-4640.

Figure 35. **R&D/GNP by country**



Nondefense R&D/GNP by country

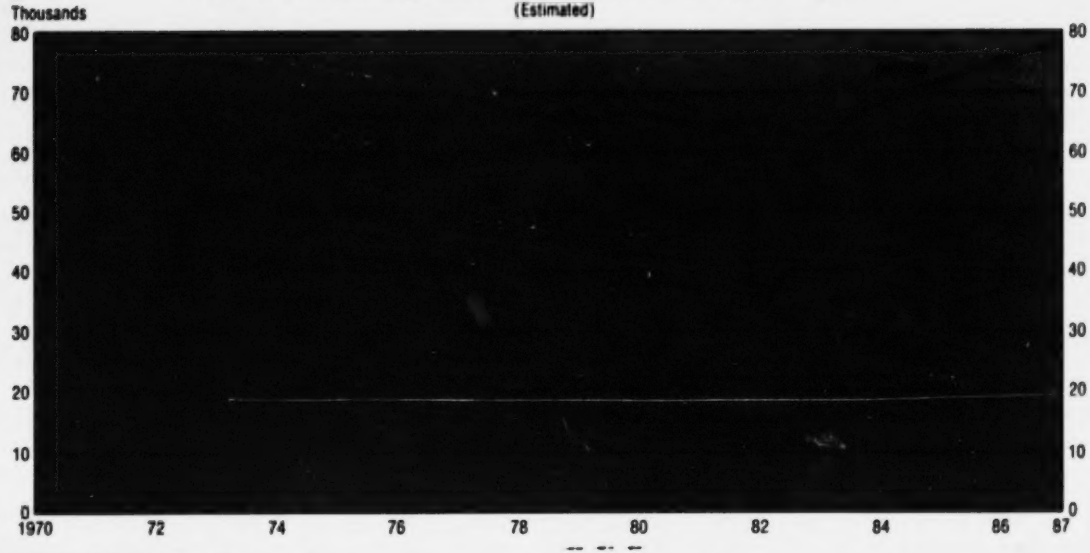


[a]French data are based on GDP, and consequently percentages may be slightly overstated compared to GNP.
[b]Foreign currency conversions to U.S. dollars are calculated with OECD purchasing power parity exchange rates. Constant 1982 dollars are based on U.S. Department of Commerce GNP implicit price deflators.
NOTE: Data for 1987 are based on national estimates of R&D expenditures. After 1977, U.S. data are budget authority instead of budget obligations.
SOURCES: National Science Foundation, SRS; Organisation for Economic Co-operation and Development, the International Monetary Fund, and national sources.
Additional data may be obtained from Jennifer Bond, SRS, Tel: (202) 6344-4640

Figure 36. **National expenditures on research and development[1] by selected countries: 1980-87**

[1]Gross expenditures for performance of R&D including associated capital expenditures, except for the United States where total capital expenditure data are not available.
[2]Conversions of foreign currencies to U.S. dollars are calculated based on OECD purchasing power parity exchange rates. Constant 1982 dollars are based on U.S. Department of Commerce GNP implicit price deflators.
[3]Data for 1987 are national estimates.
SOURCES: National Science Foundation, SRS; Organisation for Economic Co-operation and Development; and national sources.
Additional data may be obtained from Jennifer Bond, SRS, Tel. (202) 634-4640.

Figure 37. **U.S. patents granted to U.S. and foreign inventors by year of application**



SOURCE: U.S. Patent and Trademark Office
Additional data may be obtained from Carlos Kruytbosch, SRS, Tel. (202) 634-4682.

47

Figure 38. **U.S. receipts and payments of royalties and license fees associated with unaffiliated residents of selected countries**

[Millions of dollars: constant (1982)[1]]

[1]GNP implicit price deflators used to convert current to constant 1982 dollars.

NOTE: NA = Not available.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, unpublished data.

Additional data may be obtained from Carlos Kruytbosch, BRS, Tel: (202) 634-4682.

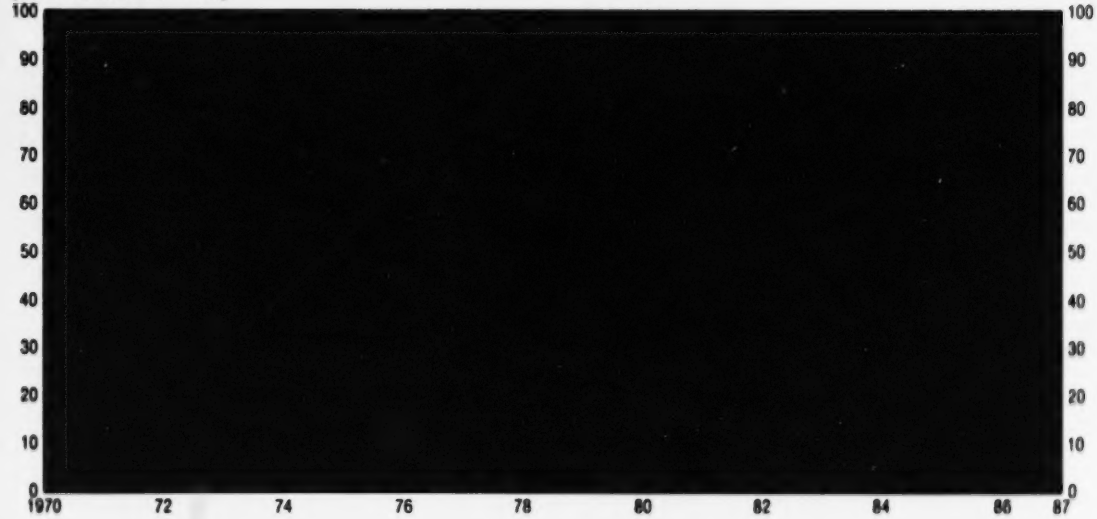
Figure 39. **Foreign direct investment in the United States**

[Millions of dollars: constant 1982[1]]

[1]GNP implicit price deflators used to convert current dollars to constant 1982 dollars.
SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis, *Selected Data on U.S. Direct Investment Abroad, 1966-79* (1980); *Survey of Current Business* (February 1981), pp. 50-51, and *Survey of Current Business* (annual, August issues).
Additional data may be obtained from Carlos Kruytbosch, SRS, Tel. (202) 634-4682.

Figure 40. **Gross domestic product per employed person**

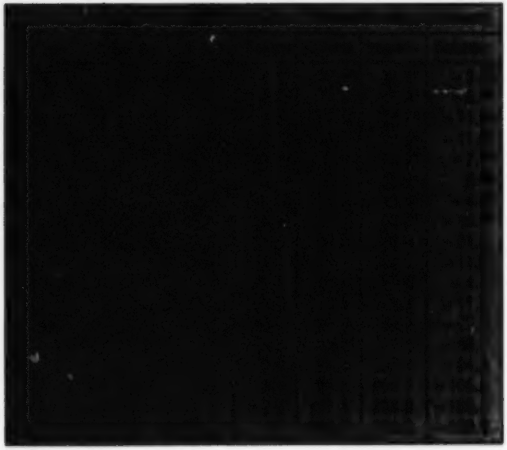
[Index: United States = 100]

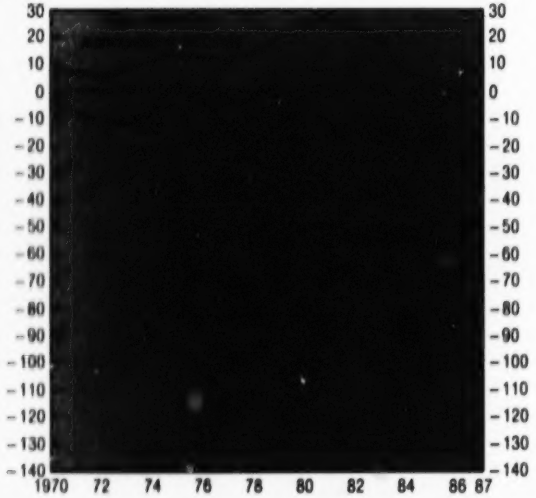


SOURCE: Bureau of Labor Statistics, Department of Labor
Additional data may be obtained from Jennifer Bond, SRS, Tel: (202) 634-4640.

Figure 41. **U.S. trade balance[1] in high-technology[2] and nonhigh-technology manufactured products, 1970-87**

[Billions of dollars]





[1] U.S. Department of Commerce BOC-3 definition

[2] = estimated

Note: Exports for 1970-77 exclude special-category exports and 1978-80 exclude trade with U.S. Virgin Islands and foreign countries. After 1977, U.S. non-high technology exports also include undocumented exports to Canada.

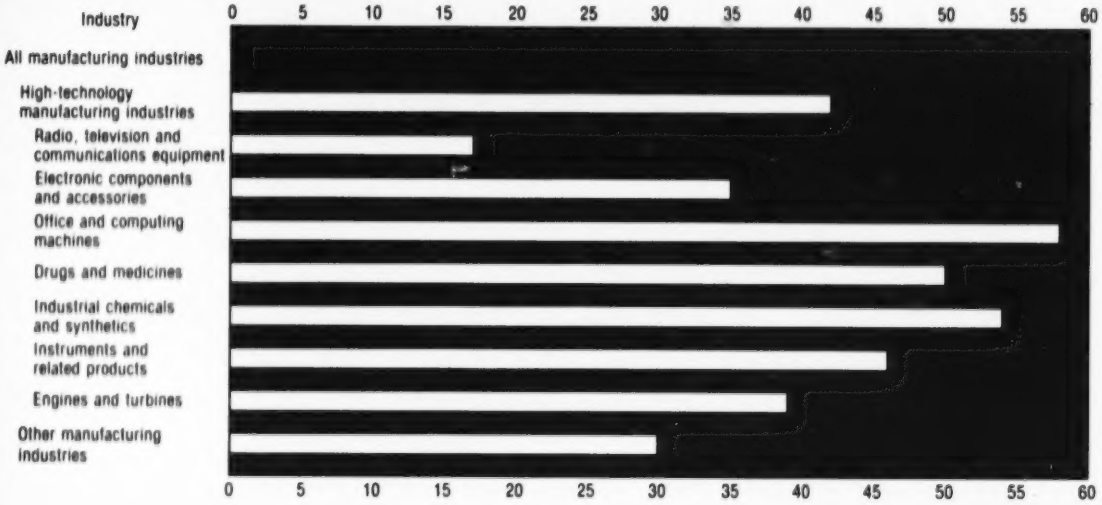
SOURCES: U.S. Department of Commerce, *U.S. Trade Performance in 1983 and Outlook, 1984*, and *United States Trade Performance in 1985 and Outlook, 1986*, and unpublished data.

Exports less imports

SOURCE: Department of Commerce, International Trade Administration

Additional data may be obtained from Jennifer Bond, SRS, Tel: (202) 634-4640.

Figure 42. **Total foreign affiliate assets of U.S. corporations, as a percent of total parent assets: 1986**



SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, U.S. Direct Investment Abroad: Selected data for Foreign Affiliates and U.S. Parents in all Industries, Preliminary 1986 Estimates.

Additional data may be obtained from Carlos Kruytbosch, SRS, Tel: (202) 634-4682.

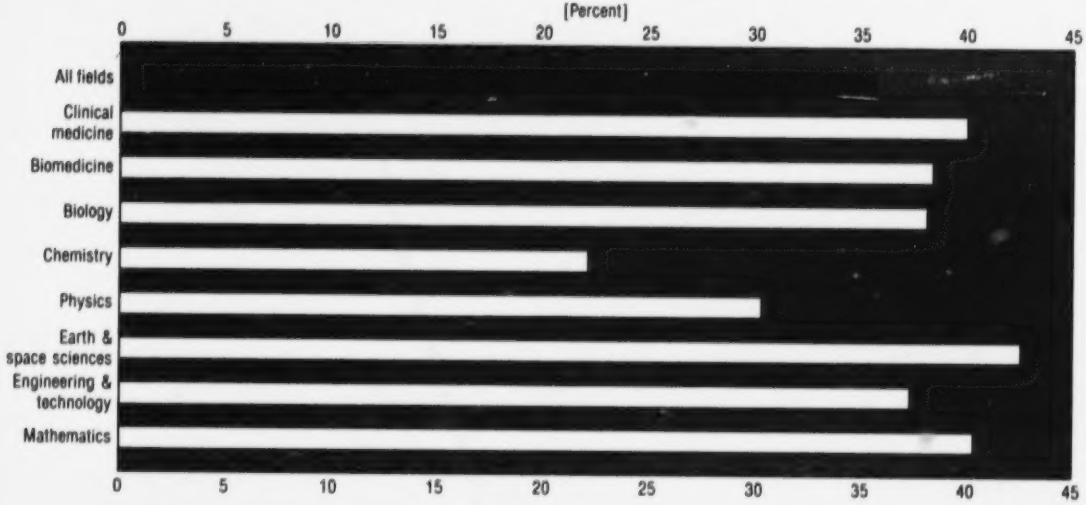
Figure 43. **Exports of high-technology[1] products as a percent of shipments: 1976-86**

[1]U.S. Department of Commerce DOC 3 definitions.
SOURCES: U.S. Department of Commerce, International Trade Administration, *U.S. Trade Performance in 1983 and Outlook* (June, 1984), and unpublished data; Bureau of the Census, *Statistical Abstract of the United States, 1986* (1987), and Bureau of the Census, *Annual Survey of Manufactures, Value of Product Shipments* (M85(AS)-2), January 1987 and previous editions.
Additional data may be obtained from Carlos Kruytbosch, SRS, Tel. (202) 634-4582

Figure 44. **Export market shares, selected high-technology products: 1976, 1980, and 1988**

SOURCES: National Science Foundation, SRS, "DRI Special Tabulations of International Trade," 1988.
Additional data may be obtained from Jennifer Bond, SRS, Tel. (202) 634-4640.

Figure 45. **U.S. scientific and technical (S/T) publications as a percent of world S/T publications: 1986**



NOTE: These data are based on the articles, notes, and reviews in over 3,000 influential journals carried in the 1981 *Science Citation Index* of the Institute for Scientific Information. An article written by researchers from more than one country is prorated across the countries involved.
SOURCE: Computer Horizons, Inc.
Additional data may be obtained from Carlos Kruytbosch, SRS, Tel: (202) 634-4682.

Other Science Resources Publications

NOTE: Except where otherwise noted, all publications in this list are in paper copy and may be obtained gratis from the National Science Foundation, Washington, D.C. 20550.

Highlights

R&D Funds	NSF No.
"Economic Outlook and Corporate Mergers Dampen Growth in Company R&D"	88-311
"Industrial Biotechnology R&D Performance Increased an Estimated 12 Percent in 1987 to $1.4 Billion"	88-306
"Non-Federal Sources Lead Growth in Academic Research Instrumentation Support"	88-319
"Real Growth in Academic R&D Spending Slowed to 2% in FY 1987, Down from 9% in 1986"	88-314
"Real Increase in 1988 National R&D Funds Estimated at Lowest Rate in Eleven Years"	88-303
"Universities Report Improvement in Computer and Physical Science Instrumentation, but Deterioration in Engineering"	87-316
S/E Personnel	
"Foreign Students Fueled 2% Rise in 1985 Graduate Science and Engineering Enrollment"	87-306
"More Recent Science and Engineering (S/E) Graduates Finding S/E Jobs"	88-310
"Recent-Doctorate Faculty Increase in Engineering and Some Science Fields"	87-310
"Scientists and Engineers Now Account for Over 4 Percent of Total U.S. Employment"	87-313
"Services Led in Private Industry Growth in Science/Engineering Jobs but Manufacturing Rebounds and Tops 1 Million in 1987"	88-304

Detailed Statistical Tables

NOTE: Data sets from most Detailed Statistical Tables reports are obtainable on both diskette and in paper copy, and data sets from all Tables reports are available through the SRS Electronic Bulletin Board. An SRS Number is given for any title for which only a diskette is available; all numbers given below are NSF Numbers except those specified as SRS.

	NSF or SRS No.
R&D Funds	
Academic Science/Engineering: Graduate Enrollment and Support, Fall 1986	88-307
Academic Science/Engineering: R&D Funds, Fiscal Year 1986	88-312
Federal Funds for Research and Development: Fiscal Years 1986, 1987, and 1988, Volume XXXVI	87-314
Federal Support to Universities, Colleges, and Selected Nonprofit Institutions: Fiscal Year 1986	87-318
S/E Personnel	
Characteristics of Doctoral Scientists and Engineers in the United States: 1985	SRS 86-D3
Characteristics of Recent Science/Engineering Graduates: 1986	87-321
Federal Scientists and Engineers: Fiscal Year 1986	87-320
Immigrant Scientists and Engineers: 1986	88-308
Science and Engineering Degrees: 1950-86, A Source Book	88-323
Science and Engineering Doctorates: 1960-86	88-309
Scientists, Engineers, and Technicians in Manufacturing Industries: 1983	SRS 86-D5
Scientists, Engineers, and Technicians in Nonmanufacturing Industries: 1984	SRS 86-D6
Scientists, Engineers, and Technicians in Trade and Regulated Industries: 1985	88-313
U.S. Scientists and Engineers: 1988	88-322

Reports (analytical)

Note: All Reports are available in paper copy. Additionally, selected tables from some of these Reports [designated in the following list by an asterisk] are obtainable on diskette and through the SRS Electronic Bulletin Board.

Overviews	
Biotechnology Research and Development Activities in Industry: 1984 and 1985	87-311
Foreign Citizens in U.S. Science and Engineering: History, Status, and Outlook	86-305 (rev.)
Geographic Distribution of Industrial R&D Expenditures	88-317

	NSF No.
International Science and Technology Data Update: 1987	87-319*
National Patterns of Science and Technology Resources: 1987	88-305*
Profiles — Chemistry: Human Resources and Funding	87-307
Profiles — Computer Science: Human Resources and Funding	88-324
Profiles — Electrical/Electronics Engineering: Human Resources and Funding	88-326
Profiles — Mechanical Engineering: Human Resources and Funding	87-309
Profiles — Psychology: Human Resources and Funding	88-325
Science and Engineering Indicators — 1987	NSB 88-1
Scientific and Engineering Research Facilities at Universities and Colleges: 1988	88-320
Women and Minorities in Science and Engineering	88-301*
R&D Funds	
Federal R&D Funding by Budget Function: FYs 1987-89	88-315
International	
The Science and Technology Resources of Japan: A Comparison with the United States	88-318
The Science and Technology Resources of West Germany: A Comparison with the United States	86-310
General References	
A Guide to NSF Science/Engineering Resources Data	87-308
Project Summaries: FY 1987	87-315
Project Summaries: FY 1988	
Publications List: 1977-87	87-312
Publications List: 1978-88	88-335

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

RETURN THIS COVER SHEET TO ROOM 233, IF YOU DO NOT WISH TO RECEIVE THIS MATERIAL ☐, OR IF CHANGE OF ADDRESS IS NEEDED ☐ INDICATE CHANGE, INCLUDING ZIP CODE ON THE LABEL. (DO NOT REMOVE LABEL).

BULK RATE
POSTAGE & FEES PAID
National Science Foundation
Permit No. G-69

Science and Technology Data Book

F6842
AQUISISTIONS LIBRARIAN
ERIC FAC. E.W. TOWERS 11FL
4350 EAST WEST-HIGHWAY
BETHESDA MD 20814-0000

NSF 88-332